California Public Utilities Commission Workshop 1:45 PM, May 11, 2015

Calculating MAOP after uprating or class location changes

US DOT PHMSA Office of Pipeline Safety

Topics Areas for Discussion

- Uprating to a higher MAOP
- Calculating MAOP after class location changes
- Relevant code sections of MAOP determination

Scope of Subpart K

Section 192.551:

This subpart prescribes minimum requirements for increasing maximum allowable operating pressures (uprating) for pipelines.

Uprating is not applicable to new construction.

Subpart K – Uprating

- How to do it? 192.553 General requirements.
- Can you do it?
  - 192.555 Uprating to a pressure that will produce a hoop stress of 30 percent or more of SMYS in steel pipelines. "
  - 192.557 Uprating: Steel pipelines to a pressure that will produce a hoop stress less than 30 percent of SMYS; plastic, cast iron, and ductile iron pipelines.

When might uprating be appropriate?

- If the existing MAOP was limited by the design pressure of the weakest element of the pipeline under 192.619(a)(1) - after upgrading/replacing this "weakest element" component.
- If the existing MAOP was determined by MP5 (192.619(a)(3)) - after a Subpart J pressure test that will allow the MAOP to be determined by (a)(2).
- If the existing MAOP was determined by the operator to be the maximum safe pressure after considering known corrosion on the pipeline (192.619(a)(4)) - after repair or replacement of these corroded areas.

Steel, Hoop Stress >30% SMYS

Section 192.555(b): Before increasing operating pressure above the previously established MAOP, the operator shall:

(1) Review the design, operating, and maintenance history and previous testing of the segment of pipeline and determine whether the proposed increase is safe and consistent with the requirements of this part; and

(2) Make any repairs, replacements, or alterations in the segment of pipeline that are necessary for safe operation at the increased pressure.

Subpart K is NOT a bypass or substitute for the requirements of Section 192.619.

Uprating: General Requirements

- Section 192.553 governs how the increase in operating pressure must be conducted.
  - Written plan, incremental increases, and leak surveys
- Records: "… retain for the life of the segment a record of each investigation required by this subpart, of all work performed, and of each pressure test conducted in connection with the uprating."

§192.619(a)(1) Lines Being Converted or Uprated

There is a statement in 192.619(a)(1) which addresses unknown values for the design formula while Converting or Uprating a line.

- If any variable necessary to determine the design pressure under the design formula is unknown, one of the following is used:
  - Eighty percent of the first test pressure that produces yield under N5.0 of ASME B31.8; or
  - If the pipe is 12.750 or less and is not tested to yield, 200 psig.

Change in class location

Subpart L – Operations

- 192.609 Change in class location: Required study.
- 192.611 Change in class location: Confirmation or revision of maximum allowable operating pressure.

Class Location Definition §192.5

- The class location unit is an onshore area that extends 220 yards on either side of the centerline of any continuous 1-mile length of pipeline.

- The class location is determined by the buildings in the class location unit. For the purposes of this section, each separate dwelling unit in a multiple dwelling building is counted as a separate building intended for human occupancy.

§192.613
Continuing Surveillance

(a) Each operator shall have a procedure for continuing surveillance of its facilities to determine and take appropriate action concerning changes in class location, failures, leakage history, corrosion, substantial changes in cathodic protection requirements, and other unusual operating and maintenance conditions.

192.609 Change in class location: Required study

Whenever an increase in population density indicates a change in class location for a segment of an existing steel pipeline operating at a hoop stress that is more than 40 percent of SMYS, or indicates that the hoop stress corresponding to the established maximum allowable operating pressure for a segment of existing pipeline is not commensurate with the present class location, the operator shall immediately make a study to determine…

Class Location Study to determine

(a) The present class location for the segment involved.

(b) The design, construction, and testing procedures followed in the original construction, and a comparison of these procedures with those required for the present class location by the applicable provisions of this part.

(c) The physical condition of the segment to the extent it can be ascertained from available records;

(d) The operating and maintenance history of the segment;

(e) The maximum actual operating pressure and the corresponding operating hoop stress, taking pressure gradient into account, for the segment of pipeline involved; and,

(f) The actual area affected by the population density increase, and physical barriers or other factors which may limit further expansion of the more densely populated area.

§192.611 Change in class location

§192.611 Change in class location: Confirmation or revision of maximum allowable operating pressure.

- (a) If the hoop stress corresponding to the established maximum allowable operating pressure of a segment of pipeline is not commensurate with the present class location, and the segment is in satisfactory physical condition, the maximum allowable operating pressure of that segment of pipe-line must be confirmed or revised according to one of the following requirements: …

§192.611(a)

- (1) If the segment involved has been previously tested in place for a period of not less than 8 hours: …
- (2) The maximum allowable operating pressure of the segment involved must be reduced so that the corresponding hoop stress is not more than that allowed by this part for new segments of pipelines in the existing class location.
- (3) The segment involved must be tested in accordance with the applicable requirements of Subpart J of this part, and its maximum allowable operating pressure must then be established according to the following criteria: …

§192.611(b)

- (b) The maximum allowable operating pressure confirmed or revised in accordance with this section may not exceed the maximum allowable operating pressure established before the confirmation or revision.

§192.611(c)

- (c) Confirmation or revision of the maximum allowable operating pressure of a segment of pipeline in accordance with this section does not preclude the application of §§ 192.553 and 192.555.
- *The physical condition of the segment must meet the design requirements for uprating.*
- *Repairs of anomalies must be commensurate with code requirements.*

§192.611(d)

- (d) Confirmation or revision of the maximum allowable operating pressure that is required as a result of a study under §192.609 must be completed within 24 months of the change in class location. Pressure reduction under paragraph (a)(1) or (2) of this section within the 24-month period does not preclude establishing a maximum allowable operating pressure under paragraph (a)(3) of this section at a later date.

Change in class location

Class location changes occur at the time of the change in population density, and not at the time the operator notices the change.

In other words, *class location changes happen even when you are not paying attention!*

The 24-month clock starts at the time of the change, and not at the time the operator becomes aware of or documents the change.

Change in class location

Following a class location change, the operator must immediately conduct a study in accordance with § 192.609.

If the established MAOP is not commensurate with the new/updated class location's design factor as determined in 192.619(a)(1), the operator *must* confirm or revise the MAOP in accordance with § 192.611.

This confirmation or revision must take place within 24 months. See § 192.611(d).

Class Location Changes for Grandfathered Pipe

The GF clause is often used to set MAOP for pipelines that have not had a Subpart J pressure test or where the MP5 was over 72% SMYS.

- A Subpart J pressure test would be required for a class bump after a class location change. § 192.611(a)(3).
- If the operator does not do a pressure test, the MAOP can be revised down so that the corresponding hoop stress is not more than that allowed for new pipelines in the existing class location. § 192.611(a)(2).
- If the GF clause had been used to set the pipeline's MAOP over 72% SMYS, the revised MAOP is still subject to the limitations in § 192.611(a).

Questions and Answers?